In the Claims

Claims 22-47 are pending in the application with claims 27 and 38 amended herein.

1-21 (canceled).

22. (previously presented) An atomic layer deposition method comprising:

injecting at least one purge material through a purge exit port into a deposition chamber defined at least in part by chamber walls;

providing a solid barrier wall inside the chamber to separate the injected purge material from a substrate holder, the solid barrier wall extending into the chamber from at least one of the chamber walls to elevationally below a substrate on the substrate holder; and

forming a purge curtain from the injected purge material, the purge curtain extending downward from elevationally above the substrate holder and outside a lateral periphery of the substrate holder and the purge curtain flowing past the substrate holder and bypassing the substrate holder.

23. (original) The method of claim 22 wherein the purge curtain extends from one of the chamber walls comprising a lid.

24. (original) The method of claim 22 wherein the purge curtain is concentric to the substrate holder and flows axially with the substrate holder.

25. (original) The method of claim 22 wherein the purge curtain is annular.

26. (original) The method of claim 22 further comprising:

injecting at least one process chemical into the chamber from elevationally above the substrate holder and inside a lateral periphery of the substrate holder; and

delivering the process chemical to a substrate received by the substrate holder.

27. (currently amended) An atomic layer deposition method comprising:

injecting a deposition precursor into a deposition chamber defined at least in part by chamber walls and comprising a substrate holder inside the chamber, a first of the chamber walls comprising a lid having an outer surface outside the chamber and an inner surface inside the chamber and a second of the chamber walls comprising a body;

exposing a substrate on the substrate holder to the precursor and chemisorbing only one monolayer of precursor material on the substrate in the absence of another deposition precursor;

while injecting the precursor and chemisorbing the monolayer, separately injecting a purge material through at least one purge passageway through the lid from the outer surface to the inner surface and through a purge exit port into the chamber, the injected purge material flowing along at least a portion of the chamber walls; and

separating the injected purge material from the substrate holder with a flow director provided inside the chamber and minimizing backflow of the injected purge material towards the substrate holder, the flow director extending downward from elevationally above the substrate holder to elevationally below a substrate on the substrate holder.

28. (previously presented) The method of claim 27 wherein the injecting the purge material further comprises not delivering the purge material to a substrate received by the substrate holder.

29. (previously presented) The method of claim 27 further comprising forming a curtain from the injected purge material concentric to the second of the chamber walls, the curtain flowing axially with respect to the chamber.

30. (original) The method of claim 27 further comprising forming an annular curtain from the injected purge material.

31. (original) The method of claim 27 wherein the injecting purge material further comprises delivering the purge material through a dead space as to a precursor injected without the purge injection.

32. (previously presented) The method of claim 27, wherein the flow director is provided on the inner surface of the first of the chamber walls.

33. (original) The method of claim 27 further comprising distributing purge material inside the lid from at least one entry into the lid to a plurality of exits from the lid formed as an about equally spaced ring of exits outside a lateral confine of the substrate holder.

34. (previously presented) The method of claim 27 wherein the injecting the precursor further comprises injecting at least one process chemical into the chamber from elevationally above the substrate holder and inside a lateral periphery of the substrate holder.

35. (original) The method of claim 34 wherein the injecting the precursor further comprises delivering the precursor to a substrate received by the substrate holder.

36. (original) The method of claim 27 wherein the injecting the purge material occurs at a first flow rate while injecting the precursor and further comprising ceasing the precursor injection and substituting the precursor injection for additional purge material injection.

37. (original) The method of claim 36 further comprising, while the precursor injection is ceased, adjusting the first flow rate to a second flow rate different from the first flow rate.

38. (currently amended) An atomic layer deposition method comprising:

injecting a deposition precursor into a deposition chamber defined at least in part by chamber walls and comprising a substrate holder inside the chamber, a first of the chamber walls comprising a lid and the precursor delivery occurring through at least one process chemical port in the lid;

exposing a substrate on the substrate holder to the precursor and chemisorbing only one monolayer of precursor material on the substrate in the absence of any additional deposition precursor;

ceasing delivery of the precursor and delivering purge material through the process chemical port;

while delivering the purge material through the process chemical port, separately delivering a purge material through at least one purge port in the lid, the purge delivery occurring along a part of the chamber walls and through a dead space as to the process chemical port purge material; and

separating the purge port purge material from a substrate holder with a flow director provided inside the chamber, the flow director being provided to extend into the chamber from at least one of the chamber walls, the flow director extending downward from elevationally above the substrate holder to elevationally below a substrate on the substrate holder.

39. (original) The method of claim 38 wherein the purge material is not injected through the purge port during the injecting the precursor through the process chemical port.

40. (previously presented) The method of claim 22, wherein the purge curtain flowing comprises flowing the injected purge material along the chamber walls, wherein the purge curtain is formed between a dead space and an injected precursor to prevent the precursor from migrating into the dead space.

41. (previously presented) An atomic layer deposition method comprising:

injecting at least one purge material through a purge exit port into a deposition chamber defined at least in part by chamber walls;

forming a purge curtain from the injected purge material, the purge curtain extending downward from elevationally above a substrate holder and outside a lateral periphery of the substrate holder;

providing a flow director inside the chamber to cause the purge curtain to bypass the substrate holder, the flow director extending downward from elevationally above the substrate holder to elevationally below a substrate on the substrate holder; and

minimizing backflow of the injected purge material towards the substrate holder using the flow director.

42. (previously presented) The method of claim 41, wherein the purge curtain flowing comprises flowing the injected purge material along the chamber walls, wherein the purge curtain is formed between a dead space and an injected precursor to prevent the precursor from migrating into the dead space.

43. (previously presented) An atomic layer deposition method comprising:

injecting at least one purge material into a deposition chamber defined at least in part by chamber walls, a first of the chamber walls comprising a lid separate and removable from a second of the chamber walls comprising a body and the purge delivery occurring through at least one purge exit port in the lid;

injecting a first deposition precursor into the deposition chamber from elevationally above the substrate holder and inside a lateral periphery of the substrate holder through at least one process chemical port in the lid;

forming a purge curtain from the injected purge material, the purge curtain extending downward from elevationally above a substrate holder and outside a lateral periphery of the substrate holder and the purge curtain flowing past the substrate holder, the purge material being prevented from flowing towards the substrate holder by a flow director, the flow director being provided inside the chamber to separate the purge curtain and the injected precursor and to minimize backflow of the injected purge material towards the substrate holder, the flow director being affixed to an inside surface of the lid and extending into the chamber from the lid to elevationally below a substrate on the substrate holder;

flowing the injected purge material such that the purge curtain is formed between the body and the injected first precursor to prevent the injected first precursor from migrating towards the body;

exposing a substrate on the substrate holder to the first precursor and

chemisorbing only one monolayer of first precursor material on the substrate, but not chemisorbing some of the injected first precursor;

ceasing delivery of the first precursor into the chamber and delivering purge material through the process chemical port;

ceasing delivery of the purge material through the process chemical port and injecting a second deposition precursor into the deposition chamber through the process chemical port; and

exposing the first monolayer to the second precursor and chemisorbing only one monolayer of second precursor material on the first monolayer in the absence of the first precursor not chemisorbed.

44. (previously presented) The method of claim 43, further comprising flowing the injected purge material and forming the purge curtain while delivering purge material through the process chemical port.

45. (previously presented) The method of claim 43, wherein the purge curtain is concentric to the substrate holder and flows axially with the substrate holder.

46. (previously presented) The method of claim 43, wherein the purge curtain is annular.

47. (previously presented) The method of claim 43, further comprising flowing the injected purge material and forming the purge curtain while injecting the second precursor to prevent the injected second precursor from migrating towards the body.